previously. Given the flow field (from measurements), the model was verified against measured suspension concentrations. Fig. 10.4 shows predicted bottom evolution with tide for the period 2300 hr on September 24, 1968, to 0500 hr on the following day. The semi-diurnal spring range of tide during this period was 2.6 m. The initial condition corresponds to the situation at 2300 hr when the ebb current was decreasing but there was no measurable deposition. The bottom topography shown in the figure at that time may therefore be considered to represent the bed which was not scoured by the prevailing current. As observed, heavy deposition occurred by 0500 hr, at slack water following flood, particularly in the region of the turning basin. Measured deposit thickness on the order of 1 m there agreed with model result. Modeling effort such as this one can be used to generate predictive scenarios for sedimentation patterns provided the expected hydrodynamic and sedimentary boundary conditions are well known.

10.4 WETLAND RESPONSE

Shallow bays surrounded by extensive wetlands will expand rapidly in response to a rise both because of the gentle slope and the deterioration of the marshes in response to salinity increases. For example, Barataria Bay, Louisiana, has increased its surface area about 10 to 15 percent over the last century in response to about 1 m of local relative sea level rise (National Research Council, 1987b). In general, however, although wetlands are critically important as a buffer against shoreline erosion, their response to sea level change is complex and not yet fully understood in the quantitative sense.

Wetlands account for most of the land less than 1 m above sea level. These extensive marshes, swamps, and mangrove forests fringe most of the U.S. coastline, particularly along the Atlantic and Gulf coasts. Their estimated original extent in the United States was about 2.0×10^4 km^2 (Hoese, 1967). This area has been significantly reduced through a variety of actions, including an early widespread practice of filling marshlands in urban areas. Wetlands loss has also been caused by other human actions, such as the construction of canals and waterways and the diversion of fluvial sediment to the offshore (National Research Council, 1987b).